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ABSTRACT

Intelligence is related to executive performance though different kinds of executive work seem to require differing intellectual abilities. To examine these different intellectual functions and their relationship to performance ratings, 208 male executives completed the School and College Ability Test (SCAT), the Abstract Reasoning Test, and three researcher-constructed tests based on the Guilford model, i.e., anagrams, consequences and unusual uses. Analysis of the resulting scores yielded two components: general intelligence revealed by convergent thinking, and creativity revealed by divergent thinking. Within three cluster groupings of executives' positions, the two kinds of intelligence test scores were correlated with performance ratings. Different validity coefficients were found in each of the three clusters, but the differences among them were of marginal significance. The findings support the distinction between intelligence and creativity. (Author/MCF)

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TWO KINDS OF EXECUTIVE INTELLIGENCE

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Two Kinds of Executive Intelligence[1]

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Intelligence has been found to be associated with executive performance (Campbell, Dunnette, Lawler, and Weik, Jr., 1970). Different kinds of intellectual ability seem to be required for different kinds of executive work. This inquiry is concerned with different kinds of intellectual functions found in executives.

The subjects of this study were 208 male executives of a large California public utility (Rusmore and Childress, 1981). They were tested in the late 50's; the data have been recently re-examined and processed by new methods. The tests included: The School and College Ability Test (SCAT), Form UA; the Abstract Reasoning Test, Form A; and three researcher-constructed tests following the Guilford model, Anagrams, Consequences and Unusual Uses. The number of scores was seven because the SCAT yielded two scores, the Verbal (V) and the Quantitative (Q) and the Consequences test yielded two scores, the Obvious and the Remote.

Thus, there were five instruments and seven scores. An examination of the intercorrelations of these tests revealed that the values ran from .17 to .65 with a mean of about .43. As the reliability of these tests was adequate (see Table 1), the low intercorrelations suggested that the different tests were measuring different variables of intellect. The test intercorrelations are presented in Table 2.

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[1] Paper accepted for presentation at the meetings of the Western Psychological Association, Los Angeles, April 9, 1981.

FACTOR ANALYSIS

This matrix of test intercorrelations were subjected to a principal components analysis. The results from this analysis are given in Table 3. Here it can be seen that the decreasing eigenvalues suggest that the matrix has become unstable beyond the extraction of two factors. Our first stopping rule was the conventional one of continuing to extract factors down to an eigenvalue of 1. It can also be seen that most of the variance has been accounted for by the same two-factor extraction. Less than 10 percent of variance (our second rule for stopping) was accounted for by the third factor of the principal components analysis.

Rotation proceded by the Varimax method. After rotation, the two-factor solution was the most intelligible one. Just to see what would happen, we also undertook a three-factor and a four-factor solution. Both the three and four factor solutions contained factors marked by only one test. The intelligibility of these solutions grew worse as the number of factors increased. All solutions are presented in Table 4.

In consideration of eigenvalue limits (no components should be extracted when the eigenvalue falls below 1.), the percent of variance accounted for by the extraction of an additional component (no components should be considered if it accounts for less than 10 percent of variance), and a comparison of the intelligibility of factor solutions, the two-factor solution was chosen.

Factor 1 may be called General Intellectual Ability because a variety of intelligence tests load on it. The measures included in Factor 1 are the SCAT (Verbal), the SCAT (Quantitative), the Abstract Reasoning Tests, and Anagrams. Notice that they are different kinds of measures; the SCAT

(Verbal) and the Anagrams are both verbal, the SCAT (Quantitative) and the Abstract Reasoning Test are non-verbal, and all but Anagrams require a "convergent" response--Anagrams requires a divergent response.

Factor 2 may be called Creativity. The measures included in Factor 2 are Consequences (Remote), Consequences (Obvious), and Unusual Uses. All of these tests require a divergent response. Divergent thinking, measured by Factor 2, is considered a core ability of creativity.

The distinction between intelligence and creativity is not surprising; this distinction has been found in a number of studies, particularly in the fine arts (Barron & Harrington, 1981). What is special about this study is that the distinction has been found in this group of practical executives.

CUSTER ANALYSIS

The importance of this distinction is heightened by an examination of the relations between intellectual factors and performance ratings when the job types differ. The positions were clustered on the basis of the 10 scores from the Executive Position Description Questionnaire (Hemphill, 1960). When we identified the groups by the minimum-variance method and cleaned them up by iterative partitioning and multiple discriminant assignments, we found three groups. Cluster 1 had 57 positions, Cluster 2 had 54 positions, and Cluster 3 had 38. The rest of the positions were outliers or overlapping cases and were dropped fron this analysis. With performance ratings as the criterion, raw validity coefficients for General Intellectual Ability and for Creativity are shown for each cluster in Table 4.

Inspection of Table 4 shows that the factor of General Intellectual Ability was related to performance ratings in the total sample and in some clusters. It was significant in Clusters 1 and 3 but not in Cluster 2. The factor of Creativity was marginally related for the total sample but not within clusters.

Consider Factor 1, General Intellectual Ability. If Cluster 1 and Cluster 3 are combined we get a mean validity coefficient of .38, N = 95. In Cluster 2 the validity coefficient is .08, giving a difference of .30, N = 54. As there are no a priori assumptions as to which cluster would have the higher validity coeficient, a two-tailed test of significance is appropriate. This test shows that a chance difference of the obtained size (.30) could occur in either direction about six times in a hundred.

In view of this comparison, it is appropriate to differentially interpret the validity coefficient by clusters. In this sample, General Intellectual Ability was not an important variable among executives whose positions fell in Job Cluster 2.

Creativity (Factor 2), was found to be a variable among executives but it was only marginally related to rated job performance.

Table 1. Reliability Coefficients for Tests Used in this Study

Test Name	Value	Type
Anagrams	.91	K-R 20
Unusual Uses	.95	Split-half
Consequences (Remote)	.68	Test Manual
Consequences (Obvious)	.82	" "
SCAT (Verbal)	.93	" "
SCAT (Quantitative)	.91	" "
Abstract Reasoning	.90	" "

Table 2. Pearson Product-moment Coefficients of Correlation among different Tests of Intellectural Ability (N = 209)

TEST NO.	NAME	TEST NUMBER 1	2	3	4	5	6	7
1.	Anagrams		.38	.30	.43	.49	.53	.46
2.	Consequences (Remote)	.38		.40	.29	.51	.49	.43
3.	Consequences (Obvious)	.30	.40		.45	.25	.28	.17
4.	Unusual Uses	.43	.29	.45		.51	.45	.41
5.	SCAT (Verbal)	.49	.51	.25	.51		.65	.48
6.	SCAT (Quantitative)	.53	.49	.28	.45	.65		.63
7.	Abstract Reasoning	.46	.43	.17	.41	.45	.63	

Table 3. Principal Components Analysis of Intellectural Scales

Factor	Eigenvalue	% of Variance
1	3.532	50.5
2	1.103	15.8
3	.570	8.1
4	.552	7.9
5	.508	7.3
6	.444	6.3
7	.291	4.2

Table 4. Factor Loadings for Two-Factor, Three-Factor, and Four-Factor Solutions

	FACTOR SOLUTIONS (N = 208)								
TEST NAME	1	2	1	2	3	1	2	3	4
1. Anagrams	.66	.34	.66	.27	.23	.38	.22	.14	.85
2. Consequences (Remote)	.22	.77	.14	.90	.17	.09	.88	.16	.25
3. Consequences (Obvious)	.06	.83	.12	.26	.95	.10	.23	.95	.12
4. Unusual Uses	.45	.66	.41	.64	.29	.49	.63	.34	-.04
5. SCAT (Verbal)	.77	.26	.73	.40	.01	.77	.35	.05	.09
6. SCAT (Quantative)	.85	.19	.86	.14	.16	.83	.10	.17	.25
7. Abstract Reasoning	.83	.06	.83	.08	.02	.80	.05	.03	.25

Table 5. Coefficients of Correlation for General Ability and for Creativity with Performance Ratings in Each of Three Job Clusters.

	Job Cluster			All Men in Sample
NAME OF FACTOR	1 1	2 2	3 3	
	N = 57	N = 54	N = 38	N = 208
General Intellectual Ability	.36*	.08	.41*	.31**
Creativity	.14	.13	.01	.13*

* Considering the size of the sample and assuming a one-tailed test, coefficients of correlation of this size would not be expected by chance more than five times out of 100 (p .05).

** Coefficients of correlation of this size would not be expected by chance more than once out of one hundred (p .01).

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